

Nalco Docket No.: 7560-NES  
Customer No. 000049459

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**REMARKS**

This is in reply to the Office Action mailed on November 29, 2006 ("Office Action").

Claims 1-40 and 42-60 are currently pending.

Claims 42-50 are allowed.

Claims 37-40 and 54-59 are rejected to as being dependent on a rejected base claim.

Claims 1-27 and 60 are rejected under 35 U.S.C. § 112, first paragraph.

Claims 1-27 and 60 are rejected under 35 U.S.C. § 112, second paragraph.

Claims 1-3, 5-10, 15-16, 18-23, 51-53 and 60 are rejected under 35 U.S.C. § 102(b) over U.S. 5,324,404 ("Ott").

Claims 15-16, 18-19, 26 and 60 are rejected under 35 U.S.C. § 102(b) over U.S. 5,591,812 ("Starner").

Claims 6-10, 18-23 and 27-36 are rejected under 35 U.S.C. § 103(a) over U.S. 5,324,404 ("Ott").

Claims 1, 2 and 15 are cancelled and replaced with new claims 62, 63 and 64.

Claims 3, 5, 16 and 27 are amended to maintain proper dependency.

Claims 42, 43, 44, 53 and 60 are amended to correct obvious errors in the chemical formulas recited therein.

Claim 54 is cancelled and its subject matter incorporated into claim 51.

Claim 50 is amended to correspond to amended claim 51.

No new matter is added by this amendment.

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**DISCUSSION**

**Claim Interpretation**

Applicant agrees with the Examiner that the claims are drafted in product by process format. With regard to claim 15, now new claim 63, Applicant respectfully asserts that closed language is used with respect to the amine containing monomer such that amine compounds having more than two reactive amino hydrogen atoms are excluded.

**The Rejections under 35 U.S.C. § 112, First Paragraph**

Claims 1-27 and 60 are rejected under 35 U.S.C. § 112, first paragraph. In particular, the Examiner states:

... The claim(s) contain subject matter which was not described in the specification in such a way as to convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The claims now define "a mole ratio of di-, tri or tetra glycidyl ethers of polyols of an amine". Said ratio was not pointed out and was not found in the original specification as now claimed.

Office Action at page 3.

Applicant respectfully traverses this rejection.

Applicant has cancelled claims 1 and 2 and entered corresponding new claims 61 and 62. New claims 61 and 62 replaces "diglycidyl ethers of aliphatic diols, triglycidyl ethers of aliphatic triols, or tetraglycidyl ethers of aliphatic polyols" with "an aliphatic or cycloaliphatic compound having two reactive epoxide groups" and "diglycidyl ether of an aliphatic diol", respectively. Support for this amendment is found in the specification at page 7, line 34 to page 8, line 5 and original claims 1 and 2. As noted previously, support for the molar ratio recited in claims 60, 61 and 62 is found in the specification at page 8, lines 17-21.

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The Rejections under 35 U.S.C. § 112, Second Paragraph

Claims 1-27 and 60 are rejected under 35 U.S.C. § 112, second paragraph. In particular, the

Examiner states:

It is unclear what molar ratios are intended to define. It is unclear what are the intended materials defining said ratio since it appears the glycidyl ethers of polyols of an amine are defined as a reactant.

Claims 18-26 are indefinite since it is unclear what is applicants intended materials since the claim requires an amine capping monomer and an amine alkylating agents, i.e., said amine capping monomer would not longer be an amine capping monomer but a polymeric amine.

Office Action at page 3.

Applicant respectfully traverses this rejection.

Applicant respectfully asserts that any issues relating to clarity of original claims 1, 2 and 15 with regard to molar ratios and definitions of reactants has been cured by cancellation of these claims and entry of new claims 61, 62 and 63.

With regard to claims 18-26, Applicant respectfully asserts that "amine capping monomer" refers to a monomer having one or two available amino hydrogen atoms. The amine capping monomer reacts with terminal epoxide groups in the polymeric or oligomeric reaction product to "cap" the polymer or oligomer with secondary or tertiary amino groups. The amine capping monomer may also contain additional amino groups, which can be alkylated with N-alkylating agents having the structures recited in claims 20-25. See specification at page 10, lines 10-29 and page 11, line 10 to page 12, line 26.

The Examiner correctly notes that the amine capping monomer would no longer be a monomer once it is incorporated into the polymeric or oligomeric material. However, Applicant respectfully points out that claims 18-26 all recite the structure of the capping monomer or N-alkylating agent prior to reaction with the polymer or oligomer, not the structure of the end product resulting from reaction of the amine capping monomer or N-alkylating agent.

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For the reasons discussed above, Applicant respectfully asserts that claims 18-26, when read in light of the specification, particularly point out and distinctly claim the subject matter of the invention. Accordingly, Applicant respectfully requests withdrawal of the rejection of claims 18-26 under 35 U.S.C. § 112, second paragraph.

The Rejection of Claims 1-3, 5-10, 15-16, 18-23, 51-53 and 60 under 35 U.S.C. § 102(b) over U.S.  
5,324,404

Claims 1-3, 5-10, 15-18, 19-23, 51-53 and 60 are rejected under 35 U.S.C. § 102(b) over U.S. 5,324,404 ("Ott"). In reply to Applicants arguments in the reply dated February 1, 2006 that Ott discloses different a different composition, the Examiner states:

... Ott et al (columns 9-12, grinding resins A1-6) disclose polymer resin compositions employing DER 732 (polypropylene glycol diglycidyl ether from Dow Chemicals) reacted with 2,2'-aminoethoxyethanol ( $\text{H}_2\text{NCH}_2\text{CH}_2\text{OCH}_2\text{CH}_2\text{OH}$ ) and N,N-dimethylaminopropylamine ( $((\text{CH}_3)_2\text{NCH}_2\text{CH}_2\text{NH}_2)$ ).

Regarding claim 51, the N,N-dimethylaminopropylamine reads on the capping amine monomer and the alkylating agent is indistinct from the reaction products having complete reaction of the diglycidyl ethers or epihalohydrin capped diols since the product structures are indistinct and the halogen is a reaction by-product. Attention is further directed to claim 60(3).

Claim 60 is included in this rejection since 2,2'-aminoethoxyethanol reads on claim 60, 1)(b); when R1 is  $(-\text{CH}_2-\text{CH}_2-\text{O}-)_n$ ,  $n = 2$  and Z1 = H. DER 732 reads on components 2) and 3), which are indistinct in the final product when R8 is 2-hydroxy-3-chloropropyl. The terminal halogens would react and expected to form the same reaction products as the diglycidyl ethers. Said products reactive with the free amine nitrogens and forming a 2-hydroxypropyl linkage.

Office Action at page 4.

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In response to Applicant's arguments in the Amendment and Reply dated August 18, 2006, the Examiner states:

The use of polyphenol compounds and glycidyl ethers thereof are known in the demulsifier art and applicants have not shown that said materials disclosed in the Ott reference are distinguished based on said function as a demulsifier.

The claims do not preclude the use of (A) in making the polymers as claimed. Said argument is further inconsistent with the inclusion of aromatic groups as an alkylating agent.

Office Action at page 8.

Applicant respectfully traverses this rejection.

Applicant has cancelled claims 1, 2 and 15 and introduced corresponding new claims 61, 62 and 63 which expressly recite oligo-and polymeric reaction products of an epoxide or glycidyl compound, or a mixture thereof, where the epoxide or glycidyl compound is selected from the group consisting of aliphatic or cycloaliphatic compounds having two reactive epoxide groups, thereby excluding the resins disclosed by Ott, all of which must comprise an aromatic-group containing polymer backbone.

With regard to claim 51, Applicant has amended claim 51 to incorporate the limitations of claim 54, originally dependent on claim 51. The Examiner has indicated that claim 54 is allowable if it is presented in independent form incorporating all of the limitations of the base claim and any intervening claims.

With regard to claim 60, Applicant respectfully asserts that polymers derived from reaction of 60 1) with 60 2) or 60 3) where R8 is 2-hydroxy-3-chloropropyl are in fact fundamentally different. In particular, 60 3) where R8 is 2-hydroxy-3-chloropropyl contains one site for reaction with the amine while 60 2) has two, one on each end of the polyoxyalkylene group. The functional result is that with 60 2) the polyoxyalkylene chain is incorporated into the polymer backbone, while in the case of 60 3) it branches out from the polymer backbone. Also, due to the presence of one reactive site, 60 3) cannot be used to grow a polymer chain because at most two molecules of 60 3) can react with one molecule of amine having two reactive hydrogen atoms leaving no additional reactive sites for polymerization.

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Accordingly, Applicant respectfully asserts that as Ott discloses a different process and results in the preparation of a different polymer the rejection of claims 1-3, 5-10, 15-16, 19-23, 51-53 and 60 are under 35 U.S.C. § 102(b) over Ott must be withdrawn.

The Rejection of Claims 15-16, 18-19, 26 and 60 under 35 U.S.C. § 102(b) over U.S. 5,591,812

Claims 15-16, 18-19, 26 and 60 are rejected under 35 U.S.C. § 102(b) over U.S. 5,591,812 ("Starner").

In particular, the Examiner states:

... Starner (columns 3-4; examples and claims) discloses the reaction products of methylamine and polyglycidyl ethers. When the value of m (structure at column 3, lines 60) is greater than 1, the intermediate compound defined by  $m = 1$  has two reactive aminohydrogens and a tertiary amine. The product resulting from said compounds  $m > 1$  read on the product by process polymer compositions.

Starner (column 5, lines 10-22) disclose the use of alcohol as solvent and the compounds are tested by reacting with an acid (column 8, lines 15-25). The products resulting from diglycidyl ethers read on alkylating agents as defined. Attention is directed to claim 60 wherein the N-alkylating agents would result in the same products as the diglycidyl ethers when R8 is 2-hydroxy-3-chloropropyl.

Office Action at page 5.

In response to Applicant's arguments in the Amendment and Reply dated August 18, 2006, the Examiner states:

Applicants (pages 19 and 20) arguments regarding Starner have not been deemed persuasive since the limitation applicants assert to distinguish the reference is indefinite. Please see the above rejections under 35 USC 112.

Office Action at page 8.

Applicant respectfully traverses this rejection.

Applicant has cancelled claim 15 and introduced new claim 63 to address the issues noted by the Examiner with respect to mole ratios and definitions of reactants.

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As discussed in Applicant's Amendment and Reply dated August 18, 2006, Starner discloses using greater than 4 molar equivalents of MMA relative to the glycidyl ether in order to minimize the formation of oligomeric and polymeric products and the corresponding introduction of tertiary amino groups into the polymer. See col. 4, lines 29-38. This is in contrast to the claimed invention which claims polymeric and oligomeric reaction products which intentionally incorporate tertiary amines into the polymer backbone and also incorporates tertiary amine substituents on the polymer backbone, hence the recited amine having only two reactive amino hydrogens and at least one tertiary amine group of claim 63. See also specification at page 7, lines 16-24.

With regard to the Examiner's statements quoted above, Applicant respectfully asserts that the structural formula presented at col. 3, lines 60 cannot be equated with an amine having only two reactive amino hydrogens and at least one tertiary amine group as defined in the specification at page 7, lines 16-24 and recited in claim 60 1) as the noted structure does not result in the incorporation of tertiary amine *substituents on* the polymer backbone.

The Examiner's attention is respectfully directed to the discussion of the Ott reference, above, which explains the functional difference between the claimed diglycidyl ether of an aliphatic diol (claim 63) and the epoxy compounds of claim 60 2) and reaction products of N-alkylating agents where R8 is R8 is 2-hydroxy-3-chloropropyl.

With regard to Starner at col. 8, lines 50-55, Applicant respectfully asserts that the test method described therein results in formation of an amide bond. Reaction with an N-alkylating agent results in formation of an amine or a quaternary ammonium salt.

Finally, Applicant respectfully asserts that any disclosure in Starner relating to solvents is irrelevant given that Starner discloses the preparation of a different composition.

Accordingly, as Starner does not disclose reacting the claimed amount of amines having two reactive hydrogen atoms and amines having two reactive hydrogen atoms and a tertiary amino group with diglycidyl ether of an aliphatic diol to form an oligo- or polymeric material, Applicant respectfully asserts that the rejection of claims 15 (now 63) and 60 under 35 U.S.C. § 102(b) over Starner must be withdrawn. Similarly, as claim 15 (now 63) recites a different material formed by a different method than Starner, the rejection of claims 16, 18-19, 20 and 26, which depend therefrom, under 35 U.S.C. § 102(b) over Starner must also be withdrawn.

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The Rejection of Claims 6-10, 18-23 and 27-36 under 35 U.S.C. § 103(a) over U.S. 5,324,404

Claims 6-10, 18-23 and 27-36 are rejected under 35 U.S.C. § 103(a) over U.S. 5,324,404

("Ott"). In particular, the Examiner states:

...Ott et al (columns 9-12, grinding resins A1-A6 disclose polymer resin compositions employing DER 732 (polypropylene glycol diglycidyl ether from Dow Chemicals) reacted with 2,2'-aminoethoxyethanol ( $\text{H}_2\text{NCH}_2\text{CH}_2\text{OCH}_2\text{CH}_2\text{OH}$ ) and N,N-dimethylaminopropylamine ( $(\text{CH}_3)_2\text{NCH}_2\text{CH}_2\text{NH}_2$ ).

Ott et al differs from the claims in the use of a particular polyglycidyl ether, complete reaction of the polyglycidyl ether to form the same reaction product of N-alkylating agents when the N-alkylating agents are capped with 2-hydroxy-3-chloropropyl, or the residual by-product chloride or bromide resulting from N-alkylating agents are capped with 2-hydroxy-3-chloropropyl.

Ott et al (column 6, lines 27 et seq; particularly lines 55 and 62-65) disclose a number of polyglycidyl ether or polyepoxides including but not limited to those derived from epihalohydrins, glycerol, and polyepoxide derived from the epoxidation of olefins.

It would have been obvious to one of ordinary skilled in the art at the time of applicants' invention to employ the polyglycidyl ether or polyepoxides taught in the Ott et al reference as obvious functional equivalent to the DER 732 or the epoxy resins exemplified.

To the extent the Ott et al reference differs in that the reaction of the polyglycidyl ethers are incomplete, less than 100%, or the compositions contain some residual by-product halogen, the Ott et al reference teaches the use of alternative polyglycidyl ethers and/or polyepoxides derived from epihalohydrins. It would have been obvious to one of ordinary skilled in the art at the time of applicants' invention to employ the materials derived from epihalohydrins as an obvious equivalent to the polyglycidyl ethers and/or polyepoxides exemplified, which would have resulted in polymer compositions having the same or substantially the same structure. See MPEP 2113.

Office Action at pages 6-7.



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In response to Applicant's arguments in the Amendment and Reply dated August 18, 2006, the Examiner states:

In response to applicant's argument (pages 20 and 21) that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgement on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from applicant's disclosure, such a disclosure is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Each of the various components are specifically disclosed as polymeric components in making the Ott polymers. The demulsifying action of the polymer results from the capacity to disrupt the interface of the emulsion via polymeric charge, which the Ott polymers contain. Applicants broadly define various components in a product by process format. Said components are disclosed in the prior art in making polymer for a separate function have not been shown to provide for patentably distinct polymers.

Office Action a pages 8-9.

Applicant respectfully traverses this rejection.

Applicant has cancelled claims 1 and 15 and added new claims 61 and 63 which expressly exclude the incorporation of glycidyl ethers of polyphenols as required in all instances by Ott.

As noted previously, Applicant cannot locate any disclosure in Ott relating to capping monomers or N-alkylating agents.

The Examiner's comments quoted above regarding demulsification are duly noted. Applicant respectfully asserts, however, that there are a multitude of factors besides polymeric charge which must be considered in designing an effective demulsifier including solubility, or lack thereof, in the hydrocarbon and aqueous phases, nature of the polymer backbone, branching and nature of the branching groups and nature of the emulsion itself.

Accordingly, Applicant considers it unlikely that one of skill in the art, seeking to design a new demulsifier would look to the grinding aids of Ott for inspiration. Applicant further respectfully asserts that in any event, nothing in Ott teaches or suggests preparing a polymer which does not incorporate glycidyl ethers of polyphenols and which does incorporate the claimed combination of

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diglycidyl ethers, amines containing only two reactive hydrogen atoms, capping monomers and/or N-alkylating agents. Applicant therefore respectfully requests withdrawal of the rejection of claims 6-10, 18-23 and 27-36 under 35 U.S.C. § 103(a).

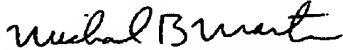
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**CONCLUSION**

In view of the foregoing amendment and remarks, Applicants respectfully request entry of this amendment and withdrawal of the rejections under 35 U.S.C. §§ 112, first and second paragraphs, 102(b) and 103(a) and respectfully assert that this application is in condition for allowance. Early notice to this effect is earnestly solicited.

Respectfully submitted,



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